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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
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DENVER, COLORADO 80202-2405

OCT 11 1989

Ref: 8HWM-RI

David P. Simonson, Manager
Department of Energy
Rocky Flats Area Office
P.O. Box 928
Golden, Colorado 80402-0928

RE: Background Study

Dear Mr. Simonson:

EPA has reviewed the January 1989 Background Hydrogeochemical Characterization & Monitoring Plan. The Plan is well written and very comprehensive. DOE and its contractors are to be commended for committing to such an important and vast scientific activity aimed at specifically identifying the background environmental conditions at the Rocky Flats Plant.

EPA recognizes that this activity is already in progress. Enclosed are comments and suggestions which EPA believes need to be addressed in order to enhance implementation of the effort and clarify how the data from this effort will be utilized for clean-up activities at Rocky Flats. Some of the enclosed comments will impact the cost and implementation of the Background Study. Of particular concern is the issue of surface contamination determinations being added to the scope of the study.

The data developed from this study will impact development of long-term remedial/corrective action alternatives. EPA advises immediate implementation of the enclosed suggestions and continuation of the effort associated with the Background Study. Also, EPA would appreciate advance notice in the event further field activities regarding this study are conducted in order to plan oversight activities.

These comments have been submitted to the Colorado Department of Health (CDH) for its review and concurrence. CDH is presently reserving the right to comment specifically on the plan in the future. EPA advises that DOE actively pursue input from CDH in order to obtain the most effective and comprehensive plan implementation possible.

If you have any questions regarding the enclosure, please contact Nathaniel J. Miullo or Martin Hestmark of EPA at (303) 293-1668 and 293-1506 respectively.

Sincerely yours,

Robert L. Duprey, Director
Hazardous Waste Management Division

ENCLOSURE

cc: w/ Enclosure
David C. Shelton, CDH
Patricia Corbetta, CDH
Kirk McKinley, Rockwell
Jane Gardner, 8RC

REVIEW OF BACKGROUND HYDROGEOCHEMICAL CHARACTERIZATION AND MONITORING PLAN

Environmental Restoration Program, Rocky Flats Plant
January, 1989

General Comments. The statistical definition of background can be complicated by the presence of values below detection for trace metals. It can also be complicated if detection limits change at different locations or between sampling events.

To gain a sense of temporal variation for the parameters of interest, it might be useful to conduct more intensive sampling of a limited basis. The statistical variability would be more quickly determined if data was collected more frequently on a limited number of wells. In the present proposal, analyses using quarterly means, implies defining these means on only two quarterly data points, after two years. It would be difficult to conclude from only two years of quarterly data, that there are recurrent or periodic trends. Monthly data collection could provide additional support for such contention; however, a number of stochastic variables (annual rainfall, ambient temperature) might influence groundwater concentrations in a way that might not be defined in a two-year period. Some specific suggestions are included in comments that follow. The Plan should identify and allow implementation of any further steps which could be taken to collect data on a more frequent basis.

Analysis of cation/anion balance can provide a good quality check on the data, allowing identification of spurious but often analytically valid data.

Section 1.2.3. The Background Monitoring Plan (the Plan) needs to be complete when identifying data quality objectives. Data quality objectives are established after also considering data quality needs, and sampling and analysis options.

Section 1.2.3.2. The primary uses of environmental measurement data must include the design of remedial alternatives. It is possible that remedial design and determination of the feasibility and cost of the remedial design may be dependent on the quality of the data obtained. The Plan should be modified to reflect this additional use of data.

Section 1.2.3.4. Precision in determining the average condition and variability of the constituent of concern within a certain media is also dependent on the number of samples taken, and calibration of the instrument(s). Thus, precision is also dependent on the sampling and analysis plan and the QA/QC plan and should be considered in the Background Plan.

ARARs are not negotiated. The language should be changed to state, "...for each priority site, while considering identified and/or determined ARARs."

Representativeness is established by collecting an adequate number of samples to characterize the media and define the variability in terms of statistical confidence intervals. The ability of the Plan to meet this criteria should be specified.

Section 1.3. It is stated that "the underlying premise of this plan is that background chemistry is considered a random statistical distribution of concentration levels, rather than a single concentration." This is almost a meaningless sentence, since even rudimentary tests as the Student-t test presume a background distribution. Also, if there is a spatial structure to values found in background, then the data is not strictly random. This statement needs to be re-worded to specify how actual data distribution will be presented and addressed in results gathered from the activities identified in the Plan.

Section 1.6. Is it premature to decide that separate tolerance intervals will not be computed for each creek? The Plan needs to delete this language or justify why this approach is taken.

Section 2.1.1.3. The Plan does not explicitly state that unweathered claystone and interbedded lenticular sandstone bedrock will be characterized. Clarification is needed in the Plan regarding this issue. (Section 2.1 states that Arapahoe/Laramie formation claystone and sandstone bedrock will be characterized.)

Section 2.2.1. The Plan needs to specify whether the wells placed to characterize the alluvial ground water also characterize the ground water associated with the weathered bedrock/alluvial interface.

Section 2.2.3. Has proposed valley fill ground water well number 22-89 been impacted by the ash pits and associated disposal resulting from use of the old incinerator? The Plan needs to include a provision for decision making on alternatives should developed wells be found to have been impacted.

Section 2.2.4. Are any of the bedrock ground water wells going to characterize the weathered claystone/alluvial or colluvial interface? The Plan needs to clarify this.

Section 2.4. There is a possibility that stream sediment southwest of the plant has been affected by plant operations. The analytical results for these sediment stations should be compared to the sediment stations located north of the plant prior to combining all sediment results for the determination of background conditions.

Section 3.1.1. Is the six foot interval being proposed for the background borehole sampling going to affect the ability to determine contamination at sites under investigation? (i.e. how will the different compositing intervals utilized in the past at sites under investigation be correlated to the compositing interval proposed for the background study?)

The Plan needs to state how the Background Study will correlate on-site background data results to the off-site surface soils contamination study which was described to EPA and CDH on May 2, 1989 by DOE and Rockwell International representatives. DOE and its contractors need to address the considerable interest expressed by the public for correlation of background soil and water surface contamination off-site to that which exists on-site. To the extent possible, consistent sampling methodologies need to be considered. If evaluation of surficial deposition of contaminants is not the intent of the on-site Background Plan, DOE and its contractors need to prepare a very clear, logical and convincing explanation of why these efforts are and/or should not be related.

EPA suggests that it is necessary to characterize the surficial soils for radiochemistry and metals. Quite often the surficial soils are markedly different in composition than underlying soils and, as a result, contain different levels of metals (generally higher). This aspect could impact the plan as far as scope and cost.

The Rocky Flats Alluvium boreholes should be sampled at the contact of the alluvium and the bedrock, so as to characterize the weathered bedrock at the contact. The procedure proposed for the colluvium/bedrock boreholes might be appropriate for the alluvial borehole sampling.

Section 3.1.2. Reference is made throughout the Background Hydrogeochemical Characterization and Monitoring Plan to 1989 documents prepared by DOE and its Contractors pertaining to Technical Data Management, Quality Assurance/Quality Control, Health and Safety and Standard Operating Procedures. EPA is reviewing these documents and

as such, complete review of the Background Study Plan is not possible. EPA will attempt to forward its QA/QC comments as soon as possible.

Section 3.1.3.1. Will the alluvial and colluvial wells be screened from 0.5 feet below the bedrock contact or from 0.5 feet below the weathered bedrock contact, to within three feet of the ground surface? (Nine bedrock wells will be completed in weathered claystone). It is important to assure that some data is gathered in the weathered bedrock.

Section 3.1.3.2. The document states that nine bedrock wells will be completed in weathered claystone. The Plan states that these wells will be screened from five feet below the alluvium/bedrock contact to fifteen feet below this contact. Is it possible to screen the alluvium/bedrock contact in these wells or are the alluvial/colluvial wells going to intercept this groundwater? This issue needs clarification.

Section 3.1.6. As surface water background is proposed to be determined through sampling the appropriate creeks during the winter and spring quarters, more than one sample should be taken during each quarter.

Section 3.1.7. Sediment samples should also be taken more than once during each winter and spring quarter in order to characterize the stream sediments in coordination with the characterization of the surface waters.

Why are the anions other than nitrate not being analyzed for the sediment characterization? The Plan needs to clearly address and justify this issue.

Section 3.3.1.1. The Background Study plan does not present a description of Rosner's Test. This is needed in order to evaluate the tests usefulness. It is unclear why the Background Study plan addresses outliers in the characterization for background, other than those resulting from analytical or sampling error. The background sample locations have been chosen for their dislocation from contaminated sites, and outliers due to contamination should not be anticipated. However, the Plan should have a contingency plan for dealing with such an event.

Data resulting from the Study activities shall not be excluded without prior approval of EPA and CDH. All background "outliers" will be reevaluated after each analyses for each new sample set. Temporal variability of a constituent's concentration may alter the range used to evaluate whether a data point is an outlier.

Section 3.3.2. Given the number of samples and length of time required to establish trends and control charts (annual averages) for surface water and groundwater data, are the corrective action and/or remedial action decisions on hold while this data is being collected? Is it necessary to collect samples from specific wells more frequently? It is important to specify the potential impact of the Plan and resulting data on remediation actions at the facility. It is probable that long term remediation will be impacted, while interim measures (i.e. IRAs) may not be impacted.

The Plan proposes using a tolerance interval to determine a potential release. Two consecutive analyses exceeding a specified tolerance interval are considered indicative of contamination. Rather than wait a full quarter for the next analysis, a repeat analysis within a month should be run for those analytes exceeding the tolerance interval.

Section 3.3.2.6. Within this section, it is stated that a tolerance interval will be computed for a constituent concentration in a background soil or water type based on the latest quarterly data. Does this mean that the tolerance interval will be recalculated utilizing all data from previous quarterly sampling or does it mean that only the one quarter will be used to evaluate the tolerance interval? This should be clarified in the Plan.

Is it accurate to state that the conditions required by Doctor, Gilbert and Kinnison (1986) have been met prior to actually sampling and analysis has been conducted? It may be more accurate to state that the conditions will be evaluated once data is available.

The plan proposes to use a lognormal distribution if the data varies over three orders of magnitude. It would be more appropriate to use a single order of magnitude criterion for evaluation of lognormality if the data base is large enough. Judgments about normality should be made only after 10 - 15 data points are available.

Section 3.3.2.8. If seasonal variation is not accounted for, control charts may not be useful in identifying variability of analyses within a season. To compare a data point to a control chart which defines variability over an entire year may preclude identification of an outlier. The data point should also be compared to a range of values for the particular season sampled in order to determine whether there has been a change in the analyte.

Is the use of control charts anticipated to extend to all wells, or just the wells which have not yet been affected by a release from a site or unit? If affected wells are to be

charted, the baseline monitoring period will reflect a well already affected by a release. How will these charts be used? Are all analytes going to be charted for control? The Plan should clarify these issues.

Isn't it possible to have new adjusted data points within control limits for a specific well, but still have a trend, so that the newly adjusted control limits would be incorrectly recalculated if the new data point was incorporated? The Plan should address this possibility.